

COMMENTARY

**Cape York: Is it the Biogeographic Key
to Northern Australia?****DAVID M.J.S. BOWMAN**

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Unlike the southern stretch of our great island continent, northern Australia has a remarkable uniformity of vegetation (Bowman & Wilson 1986). The eucalypt formations that grow on the Great Dividing Range along the east coast fade into scattered patches in the eastern corner of South Australia (Carnahan 1976). The forests and woodlands on the other side of the Nullarbor have a significantly different flora to that of the east, reflecting a long period of isolation (Burbidge 1960). In northern Australia this east-west division is less obvious. For example, the *Eucalyptus tetradonta* savannas occur from Weipa to the Kimberley, as do many other forest types (Specht et al. 1974; Specht et al. 1977). Perhaps the most interesting of these are the monsoon forests which are commonly known as rainforests, jungles or monsoon vine forests.

Patches of monsoon forest are scattered throughout the areas of northern Australia which receive summer rains and have a winter drought. These patches are thought to be the last vestiges of the great rainforest that covered northern Australia and which was destroyed by adverse climatic changes (Singh 1982), a concept which is topical because of concern about the "greenhouse effect". Monsoon forests are richest in species and largest in extent in areas which receive high rainfall (Russell-Smith 1988). In drier regions like the Gulf of Carpentaria, Victoria River District, inland areas in the Kimberley and the coastal parts of the Pindan (the most westerly monsoon forest is at Broome) jungles are typically small in area and have fewer constituent species (Wightman & Andrews 1989).

On Cape York this relationship between rainfall and rainforest complexity is amplified. The mountains of the Great Dividing Range intercept moisture from the Pacific ocean. On the wet eastern slopes complex rainforests dominate. They are ecological and taxonomic research frontiers. Given that these mountains are geologically stable and that the Aborigines did not practice slash and burn agriculture, many ancient rainforest plant species have survived. These complex forests are also the home of relictual vertebrates like Cassowary *Casuarus casuarinus*, Spotted *Phalanger maculatus* and Grey Cuscus *P. orientalis*, Striped possum *Dactylopsila trivirgata* and Giant Mosaic-tailed Rat *Uromys caudimaculatus*. Most of the rainforest mammals died out over the last 30 to 15 million years; at Riversleigh in the Gulf there are more fossil species of marsupial than are alive today (Archer et al. 1986). On the western slopes of the Cape York mountains the complex rainforests grade into floristically simpler rainforests with a lower stature

and fewer large woody vines and rattans (lawyer vines). On the plains surrounding the foothills is a widespread eucalypt savanna. On river flats gallery rainforests spread across the Cape providing important routes for the spread of rainforest organisms.

Some of the scattered monsoon forests on the western side of Cape York are structurally identical to those that occur in the wetter regions of the Top End and the Kimberley. The surrounding savannas are also similar to those in the north-west with Darwin stringy barks *E. tetradonta* and Melville Island bloodwoods *E. nesophila* dominating the forests (Specht *et al.* 1977). However the savannas and monsoon forests on the Cape have many species which do not occur in the NT or Kimberley. This difference probably reflects their proximity to the large expanses of complex rainforest on the wetter east coast of the Cape, and to Torres Strait which is an important route for the biological invasion of Australia.

Some of the Cape York monsoon forest patches are much larger than their more western counterparts (O'Neill *et al.* 1988). These big monsoon forest patches contain a wide variety of rainforest mammals and birds in marked contrast to monsoon forests of the NT and WA which are known to have few vertebrate rainforest specialists (Martin & Freeland 1988).

Australia's largest complex rainforest (on the McIlwraith Range) and monsoon forest (near Weipa) occur on Cape York (O'Neill *et al.* 1988). Both these vegetation types were once far more widespread and have been replaced by the more recently evolved and highly successful eucalypt savannas (Specht 1988). The juxtaposition of these habitats provides a remarkable opportunity to understand their interrelationships. Many of the questions that students of northern Australian monsoon forest ecology struggle with, such as: why are our monsoon forests lacking vertebrate specialists?; why are the NT and WA monsoon forests so limited in spatial extent?; and how have the monsoon forests survived through periods of aridity during the ice ages?; may in fact be best tackled on Cape York.

Furthermore, only on Cape York is it possible to understand the relationship between complex rainforest and monsoon forests. These questions are of fundamental scientific interest but also have practical implications. They can teach us about the consequences of past climatic change and the possible effects of future climatic changes. One of the great blanks in our knowledge of northern Australian ecology is the environmental history of the region. Most of our knowledge of environmental history is limited to the complex rainforests on Atherton (Singh 1981). Consequently it is difficult to speculate what the consequences of the greenhouse effect will be for the Australian monsoon tropics.

Cape York is perhaps akin to the Rosetta stone - the stone tablet that allowed scholars to understand previously unintelligible dead languages - it may hold the key to understanding northern Australian biogeography. We can only anticipate the exciting biological research that is still to be carried out on the Cape.

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